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APPENDICES 2-4 TO PART 6

MONTANA TAX STUDY

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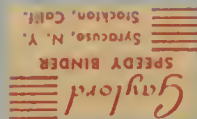
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MONTANA TAX STUDY

APPENDICES 2 THROUGH 4 TO PART SIX

by

John H. Wicks, Associate Professor of Economics, University of Montana

Ralph A. Beck, Student in Economics, University of Montana

Robert A. Little, Graduate Assistant in Economics, University of Montana

Appendix 2 ANALYSIS OF INDIVIDUAL PROPERTY ASSESSMENT

Appendix 3 THE BENEFIT BASIS FOR PROPERTY TAXATION

Appendix 4 THE BURDEN DISTRIBUTION OF THE MONTANA INDIVIDUAL INCOME TAX

A staff paper submitted through the Tax Study Task Force to the Montana Legislative
Council Subcommittee on Taxation

Members of the Task Force of Economists:

William D. Diehl, Ph. D.
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APPENDIX 2

ANALYSIS OF INDIVIDUAL PROPERTY ASSESSMENT

by Robert A. Little and John H. Wicks

Theoretically, the general property tax is a tax on all wealth which possesses value. Ideally such a tax is levied at a common rate for all property within the same taxing district, and thus is a uniform tax based upon the value of all property owned.¹

Originally, it may have been a tax upon general wealth, but exemption, discriminatory tax rates favoring certain types of property or property owners via the classification system, and assessments which do not measure full value of property all contribute to the fact that property tax, as applied in Montana differs substantially from the theory described above. The property tax has, in fact, evolved into a tax on real estate and improvements, and on various types of personal property such as automobiles and livestock.

The equity of a tax may be measured in several different ways. In the present study we shall consider two of them. The first measure concerns the property itself, and the second pertains to the economic status of the taxpayer.

One basis by which to determine whether the property tax may be said to be fair is to check its degree of uniformity or nonuniformity according to the value of property. If taxable properties having equal value are taxed identical amounts, and if properties valued at a certain proportion (say 40 percent of appraised value) are taxed at those same proportions, then the tax may be considered to be equitable. Part one of this study attempts to determine if real property is uniformly taxed. This analysis has a primarily intracounty scope for Missoula County, and also includes supplementary data from Lewis and Clark and Flathead Counties for purposes of comparing intercounty assessments.

This study also uses a second basic measure to determine the equity of property taxation: an analysis of the relationship between an individual's tax payment and his "ability-to-pay." A taxpayer's ability-to-pay is usually measured by his current net income. In this respect, if the tax paid as a proportion of net income increases faster than income increases, the tax is said to be progressive. The tax is termed regressive if income increases more rapidly than the tax liability. Lastly, if the tax payment and income change in about the same proportion, the tax is said to be proportional.

I. STUDY OF ASSESSED VALUES COMPARED WITH ACTUAL SELLING PRICES

A. Purpose and Scope

Montana law states, "All taxable property must be assessed at its full cash

1. A tax based on value is termed an ad valorem tax.

value."² A distinction must be made here between "assessed value" and "appraised value." The appraised value in theory represents the "full cash value," or market value. In the past, the general level of assessed valuations as a percentage of market values differed from county to county within the state. In an attempt to equalize intercounty assessments, the State Board of Equalization recently arrived at an assessed value fixed at 40 percent of appraised value for real estate to be adhered to statewide by each county assessor.

This part of the Tax Study has tried to determine the average level of assessments or appraisals, and the degree of uniformity of assessments or appraisals primarily within Missoula County. Additional data are later incorporated into the study for Flathead, and Lewis and Clark Counties, essentially for comparing intercounty uniformity among the three counties studied. The method employed to accomplish the stated objectives was to compare the actual market price of various types of recently transferred real estate with the current assessed valuations.

Although this analysis considered commercial or industrial property, vacant commercial or industrial sites, and rural property, the amount of data available was relatively small for these types of property, making the analysis less complete, and the results were less reliable than where the principal emphasis was the single family residence. The project concentrated therefore upon single-family residential dwellings situated within the greater Missoula area. The reasons for this emphasis are as follows:

1. Available financial backing and time for the study were limited, and Missoula County data were most readily accessible.
2. The majority of the transfers during the time period considered were single-family residences within the metropolitan Missoula area.
3. This class of property is an important component of total real estate subject to taxation.

1. Missoula County

a. Collection of Data

The random sample of property transfers considered in this study took place during a twenty-two month period from June 1964 through March 1966. Several data gathering methods were employed in an attempt to determine the actual selling price of the properties involved. These included an examination of real estate contracts at the Missoula Multiple Listing Bureau, questionnaires mailed to grantees and grantors whose names were obtained from deeds on file at the county courthouse, and collection of capital gains information (for 1964 sales only) from Montana state income tax returns. Federal revenue stamps attached to deeds at the Missoula County Courthouse were considered as a data source, but were found to be inaccurate in many cases and hence were not used in this study.

The legal description of the property and the date of sale were obtained

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2. Revised Codes of Montana, 1947, Repl. Vol. V, Part 2 (Indianapolis: The Allen Smith Company, 1966), Sec. 84-201. Full cash value is defined in Sec. 84-101 as "the amount at which the property would be taken in payment of a just debt due from a solvent debtor."

from either the real estate contract or the deed. When the date was taken from the deed, the date of the instrument was used rather than the date the deed was recorded. The assessed valuations were obtained from the 1965 assessment rolls for Missoula County. Other information gathered from one or another of the above sources included the type of transfer, and whether a reasonable market price was paid for the property. Every effort was made to exclude those transactions in which the market value obviously differed from the actual price paid, such as transfers between relatives, corporate affiliates, reorganization deeds, and so forth.

b. Analysis

(1) Residential Property

The sample of residential property consists of 326 usable sales analyzed for single-family dwellings, and eight usable sales of multi-family dwellings. The sales represent four different time periods within the twenty-two month period. Table 1 presented the average assessment to sales ratios for residential single-family dwellings. (The assessment to sales ratio for a parcel of property is its assessed valuation divided by the price it actually sold for.) It shows a consistent decline in the mean assessment to sales ratio over the entire period. The difference between the ratio at the beginning of the period and that at the end was found to be significant when statistically tested.³ Because the same set of appraisal figures was used for the entire sample, this decline was attributed to a steady rise in the price of residential property. During the period covered, this increase amounted to about five percent per year. The mean assessment ratios were adjusted accordingly, in order to put them into constant 1964 dollar terms.⁴

The mean weighted, adjusted assessment-sales ratio of 35.1 percent had a standard deviation (SD) of 6.44. The standard error of the mean (SEM) was 0.36. and the coefficient of variation (V) amounted to 18.3 percent.⁵ This amount

3. The .05, or 95 percent confidence level is used for all statistical tests unless stated otherwise. The 95 percent confidence level means that the difference was greater than could be expected by chance in 95 out of 100 cases.
4. Implicit in this adjustment is the assumption that residential property values increased more or less consistently throughout the geographical area of the sample.
5. The standard deviation (expressed in identical units as the mean ratio), is a measure of the amount by which a typical sample ratio may differ from the mean ratio. Within an approximately normal distribution, 68 percent of the ratios are included within the limits of the mean ratio plus or minus one standard deviation. Similarly 95 percent are included within the range of the mean ratio plus or minus two standard deviations, and 99 percent are within the range of the mean plus or minus three standard deviations. For example, 95 percent of the sample ratios in the above analysis of residential dwellings would fall within the range of the mean ratio (35.1 percent) plus or minus two standard deviations ($2 \times 6.44 = 12.9$) or between 22.2 and 48.0 percent.

The standard error of the mean (SEM) is a measure of the reliability of the sample mean. Assuming a normal distribution, a 95 percent chance exists that the sample mean plus or minus two standard errors would include the true mean of the population sampled.

The coefficient of variation (V) relates the standard deviation to its mean, expressed in percentage form. Again, for the above analysis the coefficient of variation is $(6.44/35.1)(100) = 18.3$ percent. Therefore, 68 percent of the sample ratios vary from the mean by 18.3 percent or less.

from either the real estate contract or the deed. When the date was taken from the deed, the date of the instrument was used rather than the date the deed was recorded. The assessed valuations were obtained from the 1965 assessment rolls for Missoula County. Other information gathered from one or another of the above sources included the type of transfer, and whether a reasonable market price was paid for the property. Every effort was made to exclude those transactions in which the market value obviously differed from the actual price paid, such as transfers between relatives, corporate affiliates, reorganization deeds, and so forth.

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TABLE 1.

ASSESSMENT TO SALES RATIOS FOR ONE-FAMILY RESIDENTIAL
PROPERTY, GREATER MISSOULA AREA

Time Period	No. of Sales	Average Assessment to Sales Ratio	Adjusted Average Assess-Ratio
June-Dec 1964	138	35.5%	35.5%
Jan-May 1965	86	33.4	34.2
June-Dec 1965	67	33.5	35.2
Jan-May 1966	<u>35</u>	32.5	34.9
Total	326		

Weighted Average = 34.2^a

Weighted Adjusted Average = 35.1

Weighted Adjusted Average Appraisal to Sales Ratio = 87.6^b

a. The weighted average reflects the differing number of sales in each time period.

b. Multiplying the assessment ratio by 2.5 results in the appraisal ratio.

of variance indicates some nonuniformity among assessments. The actual degree of nonuniformity is brought out in the conclusions of this portion of the study. The range of the assessment-sales ratios in the sample of single-family residences extended from a low of 15.2 percent, to a high of 65.7 percent. Converted to appraisal-sales ratios, the range is from 38.0 percent to 164.3 percent.

The residential sales were further broken down into various classes by type, age, value, and area to discover if there was a significant difference in average assessment or appraisal ratios among the different classes. The average assessment-sales ratios of 35.1 percent for single-family, and 37.3 percent for multi-family dwellings were tested, and it was determined that no statistically significant difference existed between their average assessment levels. For purposes of determining whether any difference existed between assessed valuations of newer and relatively older residences, properties whose ages were known were separated into two classes, one consisting of homes less than 15 years old (excluding new construction), and the other consisting of those 15 years of age and older. The actual difference of 2.1 percentage points between the average assessment ratios of 34.3 percent for the newer houses, and 32.2 percent for older dwellings was tested and found not to be statistically significant.⁶ We may conclude that the variations in assessment levels described in the preceding paragraph are not related to the type or age of dwellings. Finally, single-family residences were classified according to area, to determine if any significant difference existed among

6. Only the average ratio for the entire sample of single-family residences is adjusted for price changes over time. All other ratios are either simple or weighted averages and are so labeled.

appraisals in one area as compared to another. A difference of 2.6 percentage points between the mean assessment-sales ratio of 36.3 percent for an area consisting of older, relatively low value homes, and a ratio of 33.7 percent for an area of older, relatively high value residences was tested and found not to be significant.

(2) Commercial and Industrial Property, Vacant
Commercial and Industrial Property, and Rural Property

As previously stated, there exists a notable shortage of data for this portion of the analysis, because of a lack of verified sales prices. The final total of sales usable for the study of commercial or industrial property amounted to 23, of which ten were vacant business or industrial sites. For rural property, the final total sample consisted of 20 usable sales, of which ten may not have been used primarily for agricultural purposes.

Presented in Table 2 are the results for all the above mentioned property plus those for the total sample of residential property. The differing assessment-sales ratios in Table 2 were tested and no significant differences were found except between single-family residences and rural land-plus-improvements. This difference may be attributed to the fact that in Missoula County, farm homes only are assessed at a slightly lower percentage of appraised value than is other real estate considered in the study. If this class of property is excluded from the total sample, the weighted average assessment ratio for the entire sample is 35.2 percent, and the standard deviation and standard error of the mean remain substantially the same as when rural land and improvements are included in the total.

Although the differences in the mean assessment ratios included in Table 2 are not statistically significant, roughly one-third of the appraisals differ from the mean by about 26 percent. We may consequently conclude that assessment of the types of property involved is not uniform.

TABLE 2

THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS FOR
ALL PROPERTY SAMPLED, BY TYPE OF PROPERTY

Type	No. of Sales	Average Assess. Ratio	SD	SEM	Average Apprais. Ratio	SD	SEM	V
1 - Family Residential	326	35.1%	6.44	0.36	87.6%	16.10	0.90	18.3%
Multi-Fam Residential	8	37.3	6.85	2.59	93.3	17.13	6.48	18.4
Vac. Comm. or Indust.	10	37.9	12.69	4.46	94.8	31.73	11.15	33.5
Commercial or Indust.	13	40.3	31.63	9.12	100.8	79.08	22.80	78.5
Rural Vac. Acreage	10	28.6	16.21	5.38	71.5	40.53	13.45	56.6
Rural Land + Improvements	10	28.2	8.28	2.75	70.5	20.70	6.88	29.4
Total	377							
Weighted Average = 35.00					Weighted Average Apprais. Ratio = 87.50			
SD = 9.19					SD = 22.98			
SEM = 0.47					SEM = 1.18			
V = 26.30					V = 26.30			
Weighted Average excluding Rural Land plus Im- provements = 35.20					Weighted Average Apprais. Ratio excluding Rural Land plus Improvements = 88.00			

2. Flathead and Lewis and Clark Counties

a. Collection of Data

For Flathead County, all information included in the present study was taken directly from a report on that county's property tax problems completed by the Research Department of the State Board of Equalization in 1965. The report comprises property sales made during the period from January 1964 through February 1965. According to the report, the necessary data--including names of grantors and grantees, legal descriptions of the property, dates of the instruments, and amounts of federal revenue stamps attached to estimate sales prices--were obtained from warranty deeds on file at the County Clerk's office. The appraised and assessed valuations were available from the Classification Office.

In Lewis and Clark County the data were also gathered by the State Board of Equalization's Research Department. The methods were essentially the same as those used for Flathead County, except that questionnaires were sent to the property buyers to verify the selling prices, rather than relying upon estimates from revenue stamps. Only those transactions for which a verified sales price was available were used in the study. The sample consists of sales during 1965.

In all cases, for both counties, property transfers which did not appear to constitute bona fide sales were excluded; we excluded sales consisting of transfers between relatives, corporate affiliates, deeds of convenience, and so forth.

b. Analysis.

The Flathead County study was quite comprehensive and included several types of property throughout the county. However, the sample for Lewis and Clark County was comprised entirely of residences within the city of Helena.

As stated earlier, the primary objective of the following analysis is to permit comparisons of assessment levels and uniformity on an intercounty basis. Therefore, because the Helena sample was entirely residential and the Missoula County sample was composed primarily of residential dwellings within metropolitan Missoula, only sales of residences in Kalispell will be utilized from the Flathead County study for purposes of intercounty comparisons. Table 3 indicates the mean assessment-sales and appraisal-sales ratios for this class of property in each of the three counties.

Tests between the average ratios for Missoula and Helena showed no significant difference. The differences in the mean ratios between Kalispell and each of the other two counties, however, were determined to be significant. Some qualifications which may affect the above results must be stated, however, before arriving at any conclusions:

1. The sales analyzed in each case took place over different time periods. The Missoula County study showed a definite downward trend of mean assessment ratios over time; this means that different mean ratios might have been discovered had each study covered an identical time period.
2. A relatively small percentage of the Kalispell sales prices were subject to verification. Therefore, most are only as reliable as the amounts of federal revenue stamps affixed to the deeds finally selected. The Missoula County study showed federal revenue stamps to be an inaccurate source of data.
3. The Helena and Kalispell samples consisted of all types of residential properties; for Missoula only single-family dwellings are considered.

The average ratios for older (prior to 1956) and for newer residences are included in Table 3 in addition to the average ratio for the total sample of transferred properties in Kalispell, primarily because the differences appeared between the average ratios when grouped by age. According to the Flathead County report of the State Board of Equalization mentioned previously, the difference between these ratios was statistically significant.

TABLE 3

THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS FOR RESIDENTIAL
PROPERTIES IN HELENA, KALISPELL, AND MISSOULA

Area	Sales	Average Assessment Ratio	Range	SD	SEM	Average Appraisal Ratio	Range	SD	SEM	V
Helena	116	34.3%	17.2- 68.3%	6.82	0.63	85.8%	43.0-170.8%	17.05	1.58	19.9%
Kalispell (total)	213	43.4	24.9-178.1	13.27	0.91	108.5	62.2-445.3	33.80	2.28	30.6
Old (pre 1956)	166	44.5	28.2-178.1	14.60	1.13	111.3	70.4-445.3	36.51	2.83	32.8
New (post 1956)	47	39.8	24.9- 62.3	5.84	0.88	99.5	62.2-155.8	14.60	2.20	14.7
Missoula ^a	326	35.1	15.2- 62.7	6.44	0.36	87.6	38.0-164.3	16.10	0.90	18.3
Total	655									

a. Single family dwellings only.

Sources: Kalispell ratios from research findings of Flathead County Tax Problems, Research Department, State Board of Equalization.

Helena ratios from research done by Research Department, State Board of Equalization.

B. Conclusions

1. Intracounty

The steady decline of the mean assessment ratios for residential properties in Missoula over the nearly two-year period analyzed reflects a steady price increase, at least for this class of property. With the exception of properties which have recently been sold and since reappraised, it is apparent that the assessment-sales and appraisal-sales ratios are deteriorating because of rising prices. The same may be true for other classes of property in the Missoula area. This fact points to the need for continuing reappraisal of all real estate as often as possible, especially in an area and during a period of rapidly changing real estate values.

Since no significant difference was discovered between the assessment or appraisal ratios within the various type, age, value, and area categories examined, various categories of residential single-family dwellings in the greater Missoula area are generally appraised at about the same average level. However, appraisals appear to be more uniform in the middle value class of from \$15,000-\$19,000, than in the other value strata, and also in the relatively newer areas, as opposed to the relatively older areas of Missoula. The variance is quite large for all kinds of residences.

In view of the extremely small standard errors of the mean, it may be stated that single-family residential property is generally appraised somewhat below its true market value within the two sample areas of Helena and Missoula. The standard error of the mean is relatively small for the Kalispell residential sample also, but it appears from Table 3 that dwellings in that city are usually appraised somewhat above market price. Note, however, that newer residences seem to be generally appraised much closer to market value than are older dwellings. Older dwellings were found by the State Board of Equalization to be significantly overappraised not only in Kalispell, but in several areas in Flathead County.

In evaluating the uniformity of appraisals, it is necessary to know the degree of dispersion about the mean ratios. By examination of Table 3, it may be seen that the degree of dispersion for newer homes in Kalispell is much less than that for older homes, indicating a much greater degree of uniformity of appraisals. These results are similar to those for Missoula, where, although no significant difference was found to exist between the average ratios for older (pre 1951) and newer houses, more uniformity of appraisals was discovered in the newer areas. Sixty-eight percent of the actual ratios in any sample with a distribution approaching normality will fall within plus or minus one standard deviation of the mean ratio. Therefore, 32 percent of the ratios are more than one standard deviation away from the mean in either direction. For the sample of single-family residences in Missoula, this means that 32 percent of the assessment-sales ratios lie outside the mean ratio of 35.1 ± 6.44 , or in other words, are either less than 28.7 percent or more than 41.5 percent. Converting these figures to appraisal-sales ratios, 32 percent were appraised either below 71.6 percent of the market value, or above 103.8 percent of the actual selling price. By further extending the preceding analysis, it may be stated that 58.9 percent of the appraisals varied more than 10 percent from the mean appraisal ratio of 87.6 percent. Relating the average deviation of 12.5 percentage points to the mean appraisal ratio of 87.6 results in an average relative deviation of 14.3 percent. This means that, on the average each appraisal varied from the mean appraisal by 14.3 percent.

Similarly, for the Helena sample, 32 percent of the residences were appraised either below 68.8 percent or above 102.9 percent of actual market price, and 59.6 percent of the sample was outside of the mean appraisal ratio of 85.8 plus or minus 10 percent.

For the total Kalispell residential sample, 75.0 percent of the appraisals varied from the mean ratio in excess of 10 percent; however for newer residences alone, only 49.6 percent of the cases varied by more than 10 percent. Also it may be expected that 32 percent of the appraisals for the entire Kalispell sample were either more than 141.7 percent or under 75.3 percent, while for the newer residences only, the limits are 114.1 and 84.9 percent, respectively.

For the other classes of property in the total Missoula sample, the level of appraisals and assessments can be analyzed, but with much less degree of accuracy. For example, although the sample assessment ratio mean for commercial and industrial property was 40.3 percent, the standard error of the mean (SEM) amounted to 9.12; therefore, at the 95 percent confidence level, the true mean of the population lies somewhere between 22.1 percent and 58.5 percent. Among the four commercial or industrial and rural classes of property, however, it appears that greater uniformity of appraisals exists for rural land plus improvements, and for vacant commercial or industrial sites, than for rural vacant acreage or for commercial or industrial property. Even with the small sample of only 13 sales of commercial and industrial property, the range of the appraisal to sales ratios went from a low of 21.5 percent to a high ratio of 314.0 percent. Obviously then, some commercial property owners are paying amounts of property taxes based upon appraised valuations which are far below the actual values of their properties, and others are subject to property tax liabilities based on appraisals which substantially exceed the market value.

The results obtained for the commercial and rural sales are best described as tentative. Although it is apparent that a great degree of nonuniformity of appraisals exists within these types, greater quantities of data are needed before any firm conclusions may be reached concerning the average level of appraisals for these classes of property within Missoula County.

2. Intercounty

On an intercounty basis it may be stated that Helena residences and Missoula single-family dwellings are appraised at about the same general level--somewhat below market price. However, both newer and older residential property in Kalispell at the time the sample was obtained appeared to be appraised significantly higher than that within the other two counties sampled.

Although property types other than residential were included in the Flathead County study as well as the one for Missoula County, valid intercounty comparisons are not possible at this time. The principal reasons for this fact are as follows:

1. For each county, a few types of property which were analyzed in one county were not considered in the other.
2. The relatively small quantities of data and, more important, the great nonuniformity of appraisals for all except residential property within the Missoula County sample prohibits arriving at any average appraisal or assessment ratio upon which to base comparisons.

The three counties sampled represent only 5.4 percent of the total number of Montana counties. In addition, the comparisons were made among three metropolitan areas which, although each probably contributes substantially to its own county's taxable valuation, may not represent the actual existing appraisal ratios for residential property within that entire county. It is apparent that additional research is needed before valid intercounty comparisons may be made on a statewide basis. All that may be said at this time is that the average levels of appraisals in Missoula and Lewis and Clark counties are about the same while in Flathead County they are significantly higher. One significance of differing levels of assessments or appraisals from county to county is that a county whose assessment level is relatively higher is paying more per dollar of taxable valuation for the state mill levy than is a county with a relatively lower level of appraisals. Another involves the apportionment of state aid under the school foundation program. Since the average property owner in counties with higher levels of assessment pays higher state taxes he is discriminated against.

APPENDIX 3

THE BENEFIT BASIS FOR PROPERTY TAXATION

by John H. Wicks and Ralph A. Beck

One of the rationalizations for the taxation of property is the supposition that the property owners being taxed receive direct benefits from governmental services financed by the property tax revenue while some governmental services such as schools, for example, benefit to property owners and non-property owners alike, and there are other services, such as fire protection, which benefit the taxpayer in proportion to the amount of property they own.

The purpose of this study is to estimate the portion of state and local governmental services financed with property tax revenues which provide benefits solely to property owners. For those people who accept the value judgment that it is equitable to apportion taxation according to the amount of benefit received from governmental services, this ratio of benefits to property owners divided by total property taxes shows the portion of property taxes justified according to the benefit argument mentioned above. Rationalization of the remainder of property taxation must rest on other propositions. Two commonly mentioned alternative propositions are that property provides a measure of ability to pay taxes, and that property taxation is a workable method for local governments to raise revenue.

Method of Analysis¹

The information for this study was obtained from the published financial reports of all of the county and city governmental units in the state plus various state agencies and from interviews with randomly selected samples of county and city government officials. Almost all of the benefits from government expenditures for fire protection, irrigation, weed control, and livestock disease control go directly to property owners. As a result, simply summing all state and local governmental expenditures in 1965 on these functions provides a measure of the benefits from these activities--valued at their cost--for that year. The financial report for the fiscal year ended June 30, 1965, of each county clerk and recorder and each city clerk in the state to the state examiner and of the State Board of Equalization provided these expenditure figures.

Portions of governmental expenditures for police protection and roads also provide direct benefits to property owners. The governmental financial reports described above showed the total amount of expenditures for these services. It was then necessary to estimate the portion of these totals which financed direct benefits to property owners. These estimations were made on the basis of telephone interviews with random samples of governmental officials of the agencies responsible for the service (for example, chiefs of police). The interviews provided estimates of the percentage of the budget of that official's agency which provided property owners benefits. This percentage will subsequently be called

1. The study reported in this paper values benefits at their cost to the government which may be thought of as a minimum value. Another method would be to attempt to place a dollar valuation on the value of the benefits to the taxpayers themselves.

the benefit percentage for sake of brevity. The benefit percentages for all agencies of this type (for example, police departments) were averaged, and this average benefit percentage was multiplied by the total expenditures of all such agencies in the state to approximate the total benefit on a statewide basis. Calculation of the benefits from law enforcement activities involved the application of this process to both county sheriffs' offices and city police departments. To do this, samples of sheriffs and police chiefs were interviewed.

The sample of county sheriffs consisted of the sheriffs in the five most populous counties of the state plus a sample chosen at random of sheriffs of the remaining fifty-one counties. The benefit percentage for the sheriff's office in each of the populous counties was multiplied by the 1965 budget of that office. For the remainder of the counties in the state, the average benefit percentage was multiplied by the sum of the sheriff's budgets in these fifty-one counties. A sample of twelve city police chiefs was chosen at random from a list of the cities in the state. The average benefit percentage determined from the interviews with the police chiefs times the aggregate of all city police budgets in the state yielded an estimate of the benefits from city police expenditures. The sum of the products of the above multiplications furnished the estimate of statewide benefits to property owners from law enforcement in 1965.

The sheriffs and chiefs of police in these samples were asked the portion of the working time of their office which was devoted to matters directly concerned with property owners, rather than the public in general. Examples of activities directly serving property owners are brand inspection of cattle, and investigation of theft and property damage. The information obtained from city police chiefs was based on the monthly activity reports prepared during fiscal year 1965 by their respective departments, generally called consolidated monthly reports. These reports list the number of each type of call--for example, larceny or homicide--answered by the department during the month. The police chiefs estimated the number of calls primarily involving property and its protection, and the average total number of calls answered per month. If one allows the assumption that property-connected and general calls take the same amount of time on the average, and that the time spent on calls provides an appropriate basis for allocating the expense of operating a law enforcement agency, the ratio of the number of calls concerning property to the total number of calls measures the percentage of police expenditures which provide direct benefit to property owners. The average of the percentages obtained was multiplied by the sum of city police budgets to estimate the expenditures benefiting property owners.

The survey apportioned separated road expenditures between the categories of benefit to the general public, and benefit to property owners, by a method similar to that used for police protection. The benefits from maintenance of neighborhood streets and rural roads (as contrasted with highways) go primarily to the people whose property is served by these roads. Interviews with county road foremen in twelve counties selected randomly provided the information to estimate these benefits to property owners. In the interviews, the foremen estimated the percentage of traffic on county roads composed of people who lived along these roads, as opposed to people who live elsewhere. Since these foremen spend most of their time actually on the roads, their estimates seem a reliable data source. The twelve-county average percentage was multiplied by the aggregate of county road expenditures in 1965 by all fifty-six counties to obtain the amount of county road expenditures benefiting property owners in the state.

Interviews with street superintendents in fifteen cities furnished data to estimate the quantity of expenditures for city streets which directly benefits property owners. The superintendents estimated the portion of their departments' work spent on residential streets, as opposed to collector streets. The authors judged that the only significance of residential streets is to service the property located on these streets. On the other hand, collector streets are used mainly by the general population. The average benefit percentage in these fifteen cities was multiplied by the total street department budgets of all cities in the state to estimate the amount of city street expenditures benefiting only property owners.

The property recording function of county clerk and recorders' offices and the judicial system provide some benefits to property owners, as well as benefits to the general public. However, both of these governmental agencies levy direct charges for the services involved. The authors have assumed that these charges cover the benefits received from the services by property owners. State hail insurance for crops is financed through levy on the property involved. However, since such insurance is voluntary, the taxes collected to finance it have been excluded from the scope of the study.

Results and Conclusions

The analysis apportioning police protection expenditures between direct benefit and general service activities showed that an average of 40 percent of the expenditures of sheriffs' offices in the five large counties directly benefited property holders. In the sample of seventeen sheriffs' offices from the other counties surveyed, services to property holders accounted for 61 percent of sheriffs' budgets on the average. The difference in problems encountered in law enforcement in urban as opposed to rural counties undoubtedly accounts for the difference in these percentages. On the basis of these percentages \$902,278 in expenditures for sheriffs' offices provided direct benefits to property owners in 1965. The twelve city chiefs of police estimated that property protection accounted for an average of eight percent of the case loads of their department. There was no apparent difference in this percentage between large and small cities. This percentage times the aggregate of city police department budgets in Montana yields \$201,993 in benefits to property owners.

On the average, the twelve county road foremen surveyed estimated that vehicles of people residing on property adjacent to these roads made up 77 percent of the traffic on county roads. Taking the sample as an average for all fifty-six counties in the state, we find that seventy-seven percent of aggregate county road maintenance outlays by the fifty-six counties amounts to \$4,870,829 for 1965. The estimates by the fifteen city street superintendents surveyed of the portions of their budgets devoted to residential, as opposed to collector, streets averaged 73 percent. Total street maintenance expenditures by all cities in the state times 73 percent equals \$1,673,130 in benefits to Montana property owners in 1965.

Table 1 shows the estimates of the total expenditures which provided direct benefits to property owners in 1965, and compares these expenditures to total property tax collections in Montana. Expenditures from which the benefits are limited to property owners utilized only about 10.5 percent of property taxes when the benefits are calculated on a direct, measurable basis. About half of this percentage is accounted for by road and street expenditures.

TABLE 1

ESTIMATED DIRECT BENEFITS RECEIVED BY PROPERTY OWNERS FROM
STATE AND LOCAL GOVERNMENTAL SERVICES IN MONTANA IN 1965

Direct benefits:

City fire protection	\$1,704,909
Rural fire protection	395,372
Drainage and irrigation	2,620,784
Livestock disease control	334,659
County sheriff protection	902,287
City police protection	201,993
County roads	4,870,829
City streets	<u>1,673,130</u>
	\$12,704,163
Total property tax collections (less hail insurance)	\$111,445,532
Direct benefits to property holders compared with total property tax collections	10.52%

This study indicates that only a small portion of property taxes collected could be justified by the direct benefits which services financed by them provide to property owners. (Even this assumption depends on the value judgment that benefits received from governmental services provide a fair basis for apportioning tax burdens.) Some people apparently disagree with this justification on the ground that benefits received by a taxpayer may exceed his ability to pay for them. Therefore rationalization of the equity of property taxation apparently must be couched in terms of other propositions. Appendix II to Chapter VI analyzes one such proposition: that property taxation is effectively based on the economic ability of people to pay taxes. Other propositions are considered in Chapter VI itself.

APPENDIX 4

THE BURDEN DISTRIBUTION OF THE MONTANA INDIVIDUAL INCOME TAX

by John H. Wicks

The individual income tax (discussed in Chapter III) is now the largest producer of revenue for general expenditure purposes at the state level in Montana. It would be technically possible to raise considerable additional revenue for state governmental purposes by changing the base and/or the rates of this tax. Many people who favor progressive taxation feel that income provides the fairest basis for taxes; and personal income tax is probably the easiest type of tax to make progressive with respect to income. However, it should be kept in mind that the burden distribution of this tax is only one of the viewpoints from which it may be analyzed; its economic effects are also very important.

However, evaluation of income taxation, as it now exists or as it might exist to produce more revenue, requires information concerning the impact that each of the major provisions of the tax has on various groups of taxpayers--such as, for example, people with incomes from \$5,000 to \$7,500, or white collar workers. The information needed is primarily of a burden distribution nature--that is, one needs to know how a particular provision of the tax affects a group's tax liability. The overall pattern of the burden of the tax will reflect the collective results of all of the specific provisions of the tax. Thus, information concerning the effects of various income tax provisions on tax burden distribution establishes a basis for evaluating the fairness of our present income tax, and changes in it which may be proposed.

SCOPE OF THE STUDY

Between September 1965 and May 1966, a study of the Montana individual income tax which was made to provide information on the question discussed above. Specifically, the appendix first shows the average percentage of total income paid in tax by people in various income brackets. Then it indicates the portions of income allowed to be excluded from taxation on various grounds. When the amount of tax, or income excluded from taxation, differs from income bracket to income bracket, the variation may be due to the different levels of income themselves. On the other hand, the variation may be due in part to the occupation of the taxpayers.

The final section of the appendix shows the approximate amount of revenue gain or loss associated with various major provisions of the existing tax laws (for example, the amount of revenue foregone as a result of allowing interest paid to be deducted from taxable income.) Information of this type should be useful when considering possible changes to the tax law.

The figures reported on 1963 Montana personal income tax returns of 5,045 individuals provided the data for this investigation. These returns comprised an unbiased sample, stratified by income, of all 227,573 1963 returns. The sample was constructed to contain an approximately equal number of returns in each of nine income brackets chosen for the purpose of the study (except in the \$50,000 to \$100,000 and the above-\$100,000 brackets, where the total numbers of returns were less than the number desired for the sample).

The Montana Board of Equalization files an I.B.M. card representing each of the 227,573 returns which lists certain information, including the federal adjusted gross income of the taxpayer. To obtain the desired sample, duplicates of these cards were sorted into the nine brackets of taxpayer income. Then, to obtain the desired number of returns in each bracket, an I.B.M. 1620 computer was used to list the identification number of every n^{th} return in each income bracket, where n was the total number of returns in each bracket divided by the number of returns desired for the sample from that bracket. The returns selected were then examined, and data concerning income, adjustments to income, exemptions, deductions, and tax liability, were recorded for statistical analysis. Table 1 shows the income brackets used and the portion of returns examined in each bracket.

TABLE 1

RETURNS SAMPLED IN MONTANA
INDIVIDUAL INCOME TAX STUDY

Federal Adjusted Gross Income	Sample of Board of Equalization I.B.M. Cards	Number of Board of Equalization I.B.M. Cards	Estimated Total Number of Nonresi- dent Returns	Estimated Total Number of Resident Returns	Proportion of Estimated Resident Returns Sampled
0-\$3,000	1/98	81,927	9,604	81,339	1/109
\$3,000-5,000	1/61	51,674	4,941	47,038	1/61
\$5,000-7,500	1/69	58,162	11,247	48,571	1/69
\$7,500-10,000	1/30	25,170	1,020	23,430	1/30
\$10,000-15,000	1/14	12,004	2,772	8,826	1/14
\$15,000-25,000	1/5	4,157	945	3,172	1/5
\$25,000-50,000	1/2	1,500	186	1,292	1/2
\$50,000-100,000	all	254	130	119	all
Over \$100,000	all	110	95	12	all

Returns of taxpayers who were not Montana residents for the whole year were excluded from consideration, because the somewhat different tax provisions applying to nonresidents make it impossible to compare their returns with residents' returns. It was also necessary to exclude the returns of a few married taxpayers who filed joint federal returns but separate state returns, since it was impossible to determine how much of certain items listed applied to each spouse. The incomes on some returns did not correspond with the I.B.M. cards used in the sampling procedure,

but these returns were treated just like all other returns.¹ However, the number of returns estimated to be in each income bracket had to be adjusted accordingly for subsequent use in estimating the approximate effect on revenue of various provisions of the tax law. Table 1 also shows the number of nonresident returns in each income bracket and the results of this computation.

TAX DATA BY INCOME BRACKET

Montana Income Tax as a Percentage of Income

Table 2 shows the study's estimates of the average Montana personal income tax liability in dollar terms, and as a percentage of federal adjusted gross income, for each income bracket. Since a person's income is ultimately the only source from which he obtains the purchasing power to buy goods and services, expressing a tax as a percentage of income provides a measure of the relative amount given up by a person in tax. The same percentage of tax does not necessarily cause the same amount of sacrifice to different people; for example, a tax of three percent might burden a poor person more than a wealthy person. The author assumes that a majority of people feel a given percentage of tax does burden a poor person more than a rich one, and for this reason they advocate progressive taxation. Stating tax liability as a percentage of income allows direct determination of the progressivity of a tax--if the percentage increases along with income, the tax is progressive.

Federal adjusted gross income includes income such as wages, salaries, the net profit of unincorporated businesses, and most interest and dividends, but it excludes such things as interest on state and local bonds, approximately half of the income from capital gains, and the return from do-it-yourself projects. Federal adjusted gross income is thus not a perfect measure of income; nevertheless, the author feels that it is probably at least as good as any available.

The data in Table 2 indicate that on the average the Montana income tax is somewhat progressive for incomes up to \$100,000. (A statistical F-test indicates that the overall variation in the amount of tax among the income brackets is significant at the 99 percent level of confidence, and Tukey's W-procedure indicates that each tax percentage is significantly different from each other percentage at the 99 percent level of confidence.²) The estimated average tax as a percentage of income ranges from .29 percent on those in the zero to \$3,000 bracket of federal adjusted gross income, to 3.46 percent on people with incomes between \$50,000 and \$100,000. The average rate of tax on individuals with incomes over \$100,000 drops back to 2.72 percent. Personal exemptions of \$600 per dependent and tax rates which ranged from one percent of the first \$1,000 of Montana taxable income to seven percent on all taxable income in excess of \$7,000 account for most of the

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1. Since the data for the study was obtained from the returns themselves, the errors on the cards did not affect the data used. The only change was that there were a few more returns than planned in the samples for some income brackets, and a few less returns in other brackets. Effective administration of that tax by the Board of Equalization was not adversely affected by the incorrectly punched cards.
 2. Robert G. D. Steele and James H. Torrie, Principles and Procedures of Statistics, New York: McGraw Hill Book Co., 1960, pp. 109-110.

TABLE 1

ESTIMATED AVERAGE MONTANA INDIVIDUAL INCOME
TAX LIABILITY BY INCOME BRACKETS

Federal Adjusted Gross Income	Average Tax Liability	Coefficient of Variation of Average Tax Liability	Estimated Coefficient of Variation Not Due to Income Variation ^a	Tax Liability as a Percentage of Income
0-\$3,000	\$6	223.9	214.3	.3%
\$3,000-5,000	28	74.9	72.0	.7
\$5,000-7,500	59	62.3	59.0	1.0
\$7,500-10,000	112	55.0	52.1	1.3
\$10,000-15,000	229	48.4	41.8	1.9
\$15,000-25,000	552	40.9	29.7	2.9
\$25,000-50,000	1,118	37.9	31.5	3.4
\$50,000-100,000	2,250	44.6	36.1	3.5
Over \$100,000	5,458	----	----	2.7

a. Obtained by the following method: Let C = estimated coefficient of variation not due to income variation.

s^2 = variance in tax liability

r^2 = coefficient of determination between tax liability and income.

\bar{x} = average tax liability.

$$C = \frac{s \sqrt{1 - r^2}}{\bar{x}}$$

progressivity of the tax on income up to \$100,000. The fact that federal income tax paid can be deducted is the primary reason that the average tax rate on the income bracket exceeding \$100,000 is less than the three preceding brackets.

Although the average tax liability increases with income over the first eight income brackets, some taxpayers in an income bracket may pay an amount of tax which is considerably different from the average. Such a variation in tax liability will occur if the amount of deductions and personal exemptions allowed varies significantly from taxpayer to taxpayer. A commonly used tool for measuring the amount by

which the typical item in a group of data differs from the average is called the standard deviation.³ One useful way to express the standard deviation is as a percentage of the mean (or arithmetic average) of the data. This measure, known as the coefficient of variation, thus provides a measure of the average amount of deviation from the average.

As Table 2 shows, the coefficient of variation of the amount of Montana income tax as paid by taxpayers in the various income brackets is rather large. For instance, in the \$5,000-7,500 income bracket, the average tax is one percent of income, but the average amount of variation in tax liability is 62.3 percent of the average liability. Some of the variation in tax liability is due to differences in income within each income bracket. The estimated coefficients listed in the fourth column of the table provide an approximate measure of the variation in tax liability, independent of the effect that income has on tax liability. After adjustment for the effect of income differences within the income bracket, the approximate average amount of variation is estimated to be 55.9 percent. This variation is probably due to such items as deductions, exemptions, and favorable treatment given to capital gains. Therefore, the next section of the paper deals with these items.

Differentials in Deductions, Exemptions, and Capital Gains

As the reader may recall from Part One of the Tax Study, deductions are expenditures which an individual may subtract from his income in determining taxable income. The major deductions permitted by the Montana income tax law are medical expenditures in excess of prescribed percentages of income, interest paid, and federal income tax paid. An exemption refers to an amount of income which may be subtracted from taxable income. The law allows a \$600 exemption for the taxpayer himself and for each of his dependents, subject to certain restrictions. People over 65 and blind people receive an additional exemption. The Montana income tax, like the federal income tax on which it is patterned, excludes from taxation half of the gains on most assets which were owned over six months before sale. Thus, deductions, exemptions, and the special treatment of capital gains all provide tax-free income--deductions allow tax-free income if the income is spent in certain ways, the capital gains provisions allow tax-free income if the income is earned in a certain way, and exemptions provide tax-free income regardless of how the income is spent or earned.

All taxpayers with a given level of income do not make equal use of these means for reducing tax liability, as Table 3 indicates. Three columns of this table show total deductions, the amount of exemptions (\$600 times the number of dependents and other allowed exemptions), and the amount of income excluded from taxation due to the capital gains provision, respectively divided by adjusted gross income for each of nine income brackets. (A statistical F-test indicates that the overall variation among the means in each column is significant at the 99 percent confidence level.) Adjacent columns in the table list an estimate of the coefficient of variation not due to income variation within the income bracket for deductions, personal exemptions, and tax-exempt capital gains respectively. The reader may note that the amount of these items vary widely from individual to individual

3. Mathematically, the standard deviation is defined as the square root of the sum of the squares of the amounts by which the individual items in a group of data differ from the mean, divided by the number of items.

TABLE 3

ESTIMATED AVERAGE PERCENTAGE OF INCOME NOT TAXED DUE TO EXEMPTIONS,
DEDUCTIONS, AND SPECIAL TREATMENT OF CAPITAL GAINS

Federal Adjusted Gross Income	Total Deductions ÷ Income	Estimated Coefficient of Variation ^a	Amount of Exemptions ÷ Income	Estimated Coefficient of Variation ^b	Exempt Capital Gains ÷ Income	Estimated Coefficient of Variation ^c
0-\$3,000	16.2%	142%	71.7%	72%	0.9% ^e	--
\$3,000-5,000	20.5	61	38.9	65	0.6	1,131%
\$5,000-7,500	22.4	44	32.9	55	0.4	1,381
\$7,500-10,000	23.9	36	27.4	49	1.0	1,354
\$10,000-15,000	23.9	42	19.8	48	1.7	621
\$15,000-25,000	25.4	48	12.6	51	2.6	500
\$25,000-50,000	30.4	48	7.7	49	3.6	410
\$50,000-100,000	40.4	47	3.7	50	11.4	163
Over \$100,000	58.5	--	0.5	--	17.0	--

a. ... of Total Deductions Not Due to Income Variation^d

b. ... of Exemptions Not Due to Income Variation

c. ... of Exempt Capital Gains Not Due to Income Variation

d. Computed as Described in Table 2.

e. Capital gains as a percentage of income is not significantly different from zero in this income bracket. For all other brackets, it is different from zero at the 95 percent or greater confidence level.

within each income bracket. The estimated coefficient of variation of total deductions exceeds one-third in all income brackets. In all brackets, exemptions vary by over 47 percent. One may conclude that these provisions for tax-free income reduce tax liabilities for some taxpayers more than others.

The reader may observe that, in addition to having varying impacts on different people, aggregate deductions and income exempt from taxation reduce the progressivity of the tax, while exemptions increase progressivity. Tukey's ...-procedure indicates that the percentage that each of these items is of income for each income bracket is significantly different from the percentage in each other bracket at the 99 percent confidence level, except that the percentage of deductions in the \$7,500 to \$10,000 bracket does not significantly differ from the percentage in the

\$10,000 to \$15,000 bracket.) When deductions and tax-free capital gains account for larger portions of income for high income taxpayers than of low income people on the average, they reduce the tax liabilities of high income people by a greater proportion than of those with low incomes. Exemptions, on the other hand, represent a higher proportion of the income of the average taxpayer with an income of less than \$3,000, but account for only a small percent of the income of a taxpayer with income exceeding \$25,000. The percentage reduction in tax liability from exemptions is much greater for those of moderate means than for those with large incomes.⁴ It must also be emphasized that these conclusions concerning progressivity apply only on the average. For instance, deductions generally help those with high incomes proportionately more than those with low earnings, but because deductions vary greatly from taxpayer to taxpayer, some wealthy taxpayers will receive proportionately less help from deductions than some taxpayers with low incomes will receive.

Medical expenses above a certain minimum; contributions to charitable, educational, and religious organizations; federal income taxes paid; and certain other taxes paid (for example, property taxes) are the major items allowed as deductions from taxable income.⁵ These deductions have differing effects on tax burdens. Table 4 shows these deductions as a percentage of taxpayer income. (A statistical F-test indicates that the overall variation in the percentages for each item is significant at the 99 percent confidence level. Tukey's -procedure indicates that for each of these deductions, the percentage in each income bracket significantly differs from the percentage in each other bracket at the 99 percent confidence level, except that the difference in the federal income tax percentage is not significantly different between the 0 to \$3,000 and \$7,500 to \$10,000 brackets and between the \$5,000 to \$7,500 and \$10,000 to \$15,000 brackets.) The data in Table 4 show that outlays for medical expenses and other taxes add to the progressivity of the income tax while the percentages of income accounted for by contributions and by federal income tax paid reduce the progressivity of the Montana tax for taxpayers with high incomes. The federal income tax deduction is the major factor causing the Montana income tax liability to be less, as a percentage of income, on incomes exceeding \$100,000 than on incomes between \$50,000 and \$100,000.

Table 5 presents estimates of the amount of the variation in these specific deductions within various income brackets, independent of the effect that variation in income within a bracket may have on deductions. These variation estimates

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4. Any exclusion of income from taxation in income tax which has progressive rates will tend to reduce the dollar amount of tax liability more for high income taxpayers than for those with lower incomes. However, the exclusion may reduce the liability proportionally less for people with high incomes than for people with low incomes.
 5. The federal income tax figure used in this analysis is the amount of tax withheld or paid by declaration during 1963. Any tax for prior years paid during the year is also deductible, while refunds received must be subtracted from deductions. However, the itemization of other year's taxes and refunds by taxpayers was not complete enough to allow inclusion of these items in the analysis. The overall effect of these adjustments is probably not significant. Other taxes allowed as deductions in 1963 included a few levies, e.g. the cigarette tax, which are no longer allowed as deductions.

TABLE 4

ESTIMATED DEDUCTIONS FOR MEDICAL EXPENSES, CONTRIBUTIONS, INTEREST
PAID, FEDERAL INCOME TAX, AND OTHER TAXES AS A
PERCENTAGE OF TAXPAYER INCOME

Income bracket	Medical	Contri- butions	Interest	Federal income tax	Other taxes
0- \$3,000	5.8%	2.3%	2.0%	12.0%	3.9%
\$3,000- 5,000	3.5	1.8	2.6	11.1	2.8
\$5,000- 7,500	2.0	1.8	4.7	11.8	3.2
\$7,500- 10,000	1.6	2.0	4.0	12.0	3.2
\$10,000- 15,000	1.4	2.1	3.3	11.8	3.0
\$15,000- 25,000	1.2	2.3	2.5	12.6	2.0
\$25,000- 50,000	0.8	3.0	2.4	16.6	1.7
\$50,000- 100,000	0.6	3.8	2.7	22.8	1.0
Over \$100,000	0.3	8.4	2.9	34.3	0.7

are stated in the form of coefficients of variation, which approximately express the average difference from the mean (arithmetic average) as a percentage of that mean. It appears that these deductions as a percentage of income vary widely among taxpayers. The estimated coefficients of the medical, contributions, and interest deductions exceed 100 percent for all of the income brackets.

TABLE 5

ESTIMATED VARIATION IN DEDUCTIONS FOR MEDICAL EXPENSES, CONTRIBUTIONS,
INTEREST PAID, FEDERAL INCOME TAX, AND OTHER TAXES
BY SELECTED INCOME BRACKETS

Income bracket	Estimated Coefficient of Variation Not Due to Income Variation within Income Brackets ^a				
	Medical	Contri- butions	Interest	Federal income tax	Other taxes
0-					
\$3,000	191%	183%	468%	122%	170%
\$3,000-					
5,000	194	181	195	58	111
\$5,000-					
7,500	204	143	123	44	80
\$7,500-					
10,000	222	137	105	39	87
\$10,000-					
15,000	202	115	119	54	75
\$15,000-					
25,000	302	148	165	67	144
\$25,000-					
50,000	471	315	189	59	94
\$50,000-					
100,000	476	182	285	68	92

a. Computed by the method described in Table 2.

IMPACT OF VARIOUS INCOME TAX PROVISIONS ON TAX COLLECTION

Methodology

This section presents the results of computations of the effect on total tax collections of each major item subtracted from or added to federal adjusted gross income in computing the amount subject to the Montana tax. These subtractions include the tax-exempt portion of capital gains income, personal exemptions, deductions, and interest on United States government bonds. The addition is interest on state and local bonds. Knowledge of the amount of impact on tax revenues caused by each of these provisions of the tax should be very valuable in any analysis of possible changes to the tax law. Part VIII of the Tax Study analyzes such possible changes in considerable detail.

The method used to estimate these effects on tax collections is based primarily on the average magnitude of each of the items in question for taxpayers in each income bracket. The average amount of a tax item (for example, contributions) for taxpayers within an income bracket, times the number of taxpayers in that bracket, yields the total amount of that item subtracted from (or added to) taxable income by people in that bracket. Multiplying this change to taxable income, by the tax rate which would have applied to this income, gives the effect on tax collections for taxpayers within that income bracket. Repeating the process for each other income bracket determines the total impact of the tax item under consideration on tax revenues.

In this study, the averages of the various items affecting tax liabilities are estimates based on a random sample in all but the two highest income brackets. (All of the returns in the upper two brackets were analyzed.) Thus, the averages found from the samples for all but the upper two brackets are undoubtedly not exactly equal to the actual averages. However, the large sample sizes in relation to the standard deviations of the data should yield satisfactorily accurate results. The results from the sample apply only to Montana residents. In order to take account of the returns of nonresidents, it has been assumed that the amount of each item affecting taxable income (except for interest, capital gains, and an adjustment allowed for income earned outside Montana by nonresidents) bears the same relationship to taxable income for nonresidents as for residents within a given bracket of gross income. Interest and capital gains of nonresidents are assumed to be completely nontaxable by Montana. The computations concerning specific deductions assume that disallowing a particular deduction would not cause taxpayers to choose to take the standard deduction of ten percent, or \$500, whichever is less. The calculations apply present tax rates to 1963 data. To project the results up to the present, the figures should be adjusted upward to reflect the income growth Montana has experienced since 1963.

Results

Table 6 shows estimates of the amounts by which tax-exempt capital gains, exemptions, deductions, and the exclusion of interest on federal bonds reduce the total state tax collections; and it indicates the amount by which the inclusion of state and local bond interest increases collections. (Interest on state and local bonds is excluded from federal taxation. It may be necessary to exclude federal bond interest from Montana taxation for constitutional reasons.) The reader may note that taxes lost through personal exemptions, deductions in total, and the deduction of federal income tax paid have relatively large impacts on the state tax collection. The impact of the special provisions concerning federal, and state and local bond interest have very small effects on tax revenue. There are, however, no policy conclusions to be drawn on the basis of these tax revenue figures alone. Economic effects and distribution of tax burden, as well as the amount of tax collected, should be included in any consideration of changes in our income tax law. Part VIII of this tax study considers some of these other economic factors.

TABLE 6

THE EFFECT ON TAX COLLECTIONS OF VARIOUS EXCLUSIONS
AND INCLUSIONS TO TAXABLE INCOME

Exclusions	Amount of Tax Revenue Lost	Percent of 1965 Total Tax Collections
Tax-exempt capital gains	\$624,000	2.9%
Federal bond interest	114,000	0.5
Exemptions	13,639,000	63.4
Total deductions	11,334,000	52.7
Medical deductions	636,000	3.0
Contributions deductions	784,000	3.6
Interest deductions	1,157,000	5.4
Federal income tax deduction	5,049,000	23.5
Other taxes deduction	992,000	4.6
<u>Special inclusion:</u>	<u>Revenue Gained</u>	
State and local bond interest	73,000	0.3

SUMMARY AND CONCLUSIONS

The primary purpose of this analysis has been to investigate the burden distribution of the Montana individual income tax. We have seen that the tax is rather progressive on incomes up to \$25,000, and somewhat progressive on incomes between \$25,000 and \$100,000. If we want our taxes to be progressive, then this progressivity may be good from a fairness viewpoint. However, the statement that a tax should be progressive does not specify how progressive the tax should be. If we should feel that our state's income tax is insufficiently progressive, then we may conclude that its exclusion of federal income tax, deductible contributions, and portion of capital gains income from taxation are undesirable, since these exclusions reduce the progressivity of the tax on the average. Should less progressivity be desired, then personal exemptions, and deductions for medical expenses and other taxes paid are open to question, for these exclusions add to the progressivity of the tax.

Furthermore, there is variation in tax liability as a percentage of income in each income bracket. The major reason for this variation is that the amount of total income which is excluded from taxation varies considerably from taxpayer to taxpayer, even when the amount is expressed as a percentage of personal income and the taxpayers are all in the same income bracket. The major exclusions from taxable income are personal exemptions, deductions, and the tax-exempt portion of

capital gains income. Each of these exclusions from income varies widely from taxpayer to taxpayer. Unless these differences among taxpayers reflect differences in the economic ability of the taxpayers, the differences in tax burdens may present a problem of fairness.

There may be some significant problems of equity with the current Montana individual income tax. The extent to which there may be undesirable inequity is largely a value judgment. This judgment depends largely on what one thinks of the exclusions from taxable income. Even if the inequities exist, actions to eliminate them may create more problems than they solve. Part VIII of the Tax Study considers a number of possible income tax changes. The material in this appendix which shows the effects of various current provisions of the law on tax collection is included to aid the analysis of Part VIII.

